

CLAIMS

1. An immersion nozzle for continuous casting, which is a nozzle comprising a cylindrical body and a pair of outlet ports formed to face each other in a side wall in the vicinity of a bottom part of the cylindrical body, wherein a ridge-shaped projection extending parallel with a discharge direction projected on a cross section of the nozzle is formed on an inner surface at the bottom part, which is formed in a waterfall basin-like recessed shape having a maximum depth of 5 mm to 50 mm.

2. An immersion nozzle for continuous casting according to Claim 1, wherein a maximum height of the ridge-shaped projection is as same as the maximum depth of the waterfall basin-like recess or is in the range of ± 10 mm of the maximum depth of the waterfall basin-like recess, in which the maximum height of the ridge-shaped projection is 5 mm to 50 mm, and the ridge-shaped projection is in one form selected from the group consisting of:

a ridge-shaped projection having a peak or a horizontal apex in the central part or in the vicinity thereof on a cross section of the nozzle, in which a ridgeline of the ridge-shaped projection extends from the peak or the horizontal apex to each of two outlet ports by decreasing a height of the projection so as to reach a position at a side wall of a waterfall basin-like

recessed shape portion lower than a lower wall of the discharge hall, or in which a ridgeline of the ridge-shaped projection extends from the peak or the horizontal apex to each of two outlet ports by decreasing a height of the projection so as to reach a bottom part and the projection itself is terminated in the vicinity of an outlet port entrance of the cross section of the nozzle; and

a ridge-shaped projection having a horizontal apex in the central part or in the vicinity thereof on a cross section of the nozzle, in which the ridgeline of the ridge-shaped projection extends from the horizontal apex to each of two outlet ports by decreasing a height of the projection or by descending vertically so as to reach the bottom part and the ridge-shaped projection is only provided in the vicinity of the central part on the cross section of the nozzle.

3. An immersion nozzle for continuous casting according to Claim 1, wherein the waterfall basin-like recess is in a form of an ellipse or oval larger than an inner diameter of a nozzle body in the discharge direction projected on the cross section of the nozzle.

4. An immersion nozzle for continuous casting according to Claim 2, wherein the waterfall basin-like recess is in a form of an ellipse or oval larger than an inner diameter of a nozzle body in the discharge direction projected on the cross section.

5. An immersion nozzle for continuous casting, which is a nozzle comprising a cylindrical body and a pair of outlet ports formed to face each other in a side wall in the vicinity of a bottom part of the cylindrical body, wherein each sectional area of the outlet ports vertical to a discharge direction projected on a cross section or longitudinal section of the nozzle is decreased toward an exit.

6. An immersion nozzle for continuous casting according to Claim 5, wherein an average height of an outlet port exit is 0.5 to 0.9 times of an average width of the outlet port exit.

7. An immersion nozzle for continuous casting according to Claim 5, wherein an upper wall of the outlet port is in a circular form having a curvature radius "R" of 30 mm to 150 mm and having a cross section of expanding inner diameter from an inner wall of the body toward the upper wall of the outlet port, and an angle of a lower wall of the outlet port is in the range of 15° upward to 45° downward.

8. An immersion nozzle for continuous casting according to Claim 6, wherein an upper wall of an outlet port is in a circular form having a curvature radius "R" of 30 mm to 150 mm and having a cross section of expanding inner diameter an inner wall of the body toward the upper wall of the outlet port, and an angle

of a lower wall of the outlet port is in the range of 15° upward to 45° downward.

9. A continuous casting method using the immersion nozzle for continuous casting defined by Claim 1, wherein an average descend flow rate of a molten metal "U" of a portion immediately above an outlet port of a body is 1.0 m/s to 2.5 m/s.

10. A continuous casting method using the immersion nozzle for continuous casting defined by Claim 5, wherein an average descend flow rate of a molten metal "U" of a portion immediately above an outlet port of a body is 1.0 m/s to 2.5 m/s.